Report of...

Compliance Emission Testing

performed for...

Lacks Enterprises, Inc.
Barden Street Plant
Kentwood, Michigan

on

Multiple Sources

May 1 and 2, 2019

021.31

Network Environmental, Inc.
Grand Rapids, MI

I. INTRODUCTION

Network Environmental, Inc. was retained by Lacks Industries to perform compliance emission sampling on the exhausts of two (2) sources located at their Barden Avenue facility in Kentwood, Michigan. The purpose of the study was to document compliance with Michigan Department of Environmental Quality, Air Quality Division, Renewable Operating Permit MI-ROP-N2079-2012 and Source-Wide Permit to Install MI-PTI-N2079-2012.

The following is a list of the sources, applicable emission limits and the compounds tested:

Stack ID	Emission Limits	Compound Sampled
SVK2	Total Cr: 0.0025 Lbs/Hr and 0.012 Mg/M^3	Total Chromium
SVK8	Total Cr: 0.0006 Lbs/Hr and 0.005 Mg/M^3	Total Chromium

The sampling was performed by R. Scott Cargill and Richard D. Eerdmans of Network Environmental, Inc. over the period of May 1 and 2, 2019. Assisting in the study was Ms. Karen Baweja of Lacks Industries and the operating staff of the facility. Mr. David Patterson of the Michigan Department of Environmental Quality, Air Quality Division, was present to observe the testing and source operation.

The following test method was used to conduct the testing:

Total Chrome – U.S. EPA Reference Method 306

II. PRESENTATION OF RESULTS

II.1 TABLE 1
TOTAL CHROME EMISSION RESULTS
CHROME PLATE (SVK-8) EXHAUST & CHROME ETCH (SVK-2) EXHAUST
BARDEN FACILITY
KENTWOOD, MICHIGAN
MAY 1 and 2, 2019

Source	Sample	Time	Air Flow Rate DSCFM	Concentration Mg/M^3	Mass Emission Rate Lbs/Hr
Chrome Plate	1	7:58-10:02	34,748	0.00064	0.000083
	2	10:18-12:22	34,462	0.00065	0.000083
	3	12:38-14:42	34,465	0.00063	0.000081
Average			**34,558**	**0.00064**	**0.000082**
Chrome Etch	1	8:01-10:05	53,235	0.0027	0.00053
	2	10:22-12:27	52,562	0.0025	0.00049
	3	12:47-14:51	52,691	0.0027	0.00053
Average			**52,829**	**0.0026**	**0.00052**

III. DISCUSSION OF RESULTS

The emission results are presented in Table 1 (Section II.1).

IV. SAMPLING AND ANALYTICAL PROTOCOL

All of the sampling locations met the minimum requirements of U.S. EPA Reference 1. All exhaust stack dimensions and all of the point locations can be seen in Appendix F. Twenty-four points (twelve per port) were used for all of the isokinetic sampling.

IV.1 Total Chrome - The Cr emission sampling was conducted in accordance with U.S. EPA Method 306. Three (3) samples, 120 minutes in duration each, were collected from the exhausts. The samples were collected isokinetically in 0.1N Sodium Bicarbonate as outlined in the method.

The samples were recovered and analyzed for total chromium by inductively coupled argon plasma/mass spectrophotometry (ICP/MS). All the quality assurance and quality control procedures listed in the method were incorporated in the sampling and analysis. Figure 1 is a schematic diagram of the total chrome sampling train.

IV.2 Exhaust Gas Parameters - The exhaust gas parameters (air flow rate, temperature, moisture, and density) were determined by employing U.S. EPA Reference Methods 1 through 4.

All the quality control and quality assurance requirements listed in the methods were incorporated in the sampling and analysis.

This report was prepared by:

R. Scott Cargill
Project Manager

This report was reviewed by:

Stephan K. Byrd
President

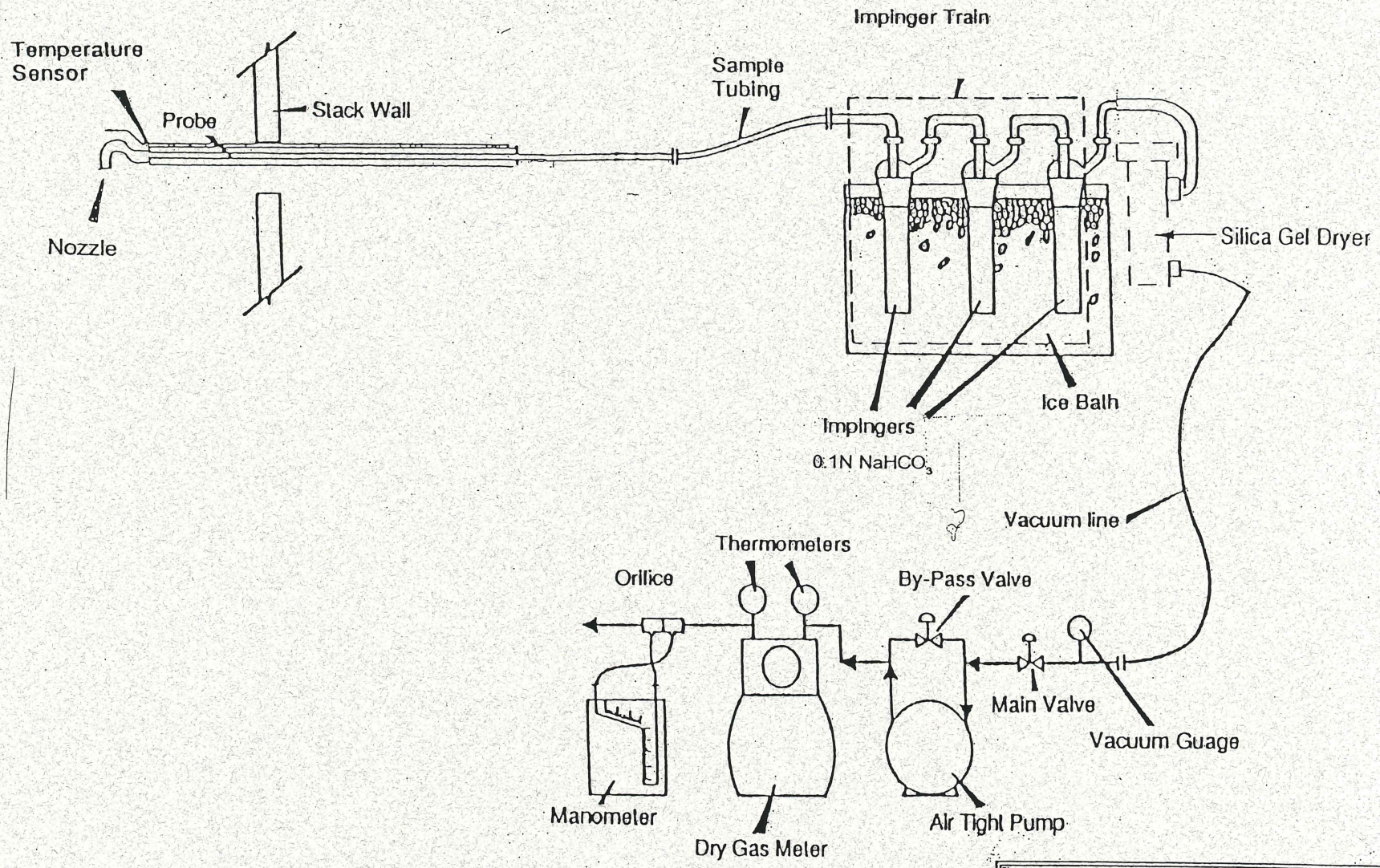

FIGURE 1

TOTAL CHROME SAMPLENG TRAIN

Company Name:	Lacks Industries Barden Plant
Company Location:	Kentwood, Michigan
Source Name:	Chrome Plate Exhaust SVK-8
Sampling Staff:	Cargill/Eerdmans
Date:	5/1/19
Number of Samples:	3
Number of Points:	24
Excess Air Calc. (Y?N)	N
Stack Diameter, In. (If Round Stack)	52.0
Stack Dimension, In. (If Rectangular)	x
% Moisture Before Collector:	

Network Environmental, Inc.

SUMMARY OF EXHAUST GAS PARAMETERS

Company Name: Lacks Industries Barden Plant Date: 05/01/19

Company Location: Kentwood, Michigan

Source Name: Chrome Plate Exhaust SVK-8

Sampling Staff: Cargill/Eerdmans

			1	2	3
	Sample Number				
G1.	Stack Diameter, inches		52.0	52.0	52.0
G2.	Area of Stack, sq ft.		14.748	14.748	14.748
G3.	Barometric Pressure, in. Hg		29.08	29.08	29.08
G4.	Static Pressure in Stack, in. H_2O		-0.31	-0.31	-0.31
G5.	Stack Gas Temperature, deg. F		74	76	77
G6.	Average Sqrt. Velocity Pressure of Points Sampled		0.7505	0.7476	0.7485
G7.	Percent Moisture At Test Location		1.83	2.06	2.10
G8.	Percent Moisture Before Collector		0.0	0.0	0.0
G9.	Dry Gas Composition:	% Oxygen	20.90	20.90	20.90
		% Carbon Dioxide	0.00	0.00	0.00
		% Carbon Monoxide	0.00	0.00	0.00
		% Nitrogen	79.10	79.10	79.10
G10.	Percent Excess Air At Test Location				
	Density And Molecular Weight Of Stack Gas:				
G11.	Dry, @ STP, lbs./cu. ft.		0.07455	0.07455	0.07455
G12.	Wet, @ STP, lbs./cu. ft.		0.07404	0.07397	0.07396
G13.	Wet, @ Stack Conditions, lbs./cu. ft.		0.07113	0.07071	0.07059
G14.	Molecular Weight, Dry, @ STP, lbs/mole		28.844	28.844	28.844
G15.	Average Gas Velocity, feet/min		2,498	2,496	2,501
	Stack Gas Flow Rate:				
G16.	Stack Conditions, ACFM		36,843	36,809	36,887
G17.	Standard Conditions, SCFM		35,395	35,186	35,204
G18.	Standard Conditions, Dry SCFM		34,748	34,462	34,465

Standard Temperature and Pressure (STP) = 29.92 inches Hg, 68 deg. F

Network Environmental, Inc.

SUMMARY OF PARTICULATE TRAIN PARAMETERS

Company Name: Lacks Industries Barden Plant Date: 05/01/19

Company Location: Kentwood, Michigan

Source Name: Chrome Plate Exhaust SVK-8

Sampling Staff: Cargill/Eerdmans

	Sample Number	1	2	3
P1.	Number of Points Sampled	24	24	24
P2.	Duration of Sample, minutes	120	120	120
P3.	Nozzle Diameter, inches	0.25	0.25	0.25
P4.	Nozzle Area, sq. ft.	0.000341	0.000341	0.000341
P5.	Pitot Calibration Factor	0.81	0.81	0.81
P6.	Meter Calibration Factor	0.9903	0.9903	0.9903
P7.	Average Filter Temperature, deg. F			
P8.	Average Meter Temperature, deg. F	88.3	91.2	91.6
P9.	Average Meter Pressure, inches of water	2.539	2.513	2.536
P10.	Meter Volume, Actual Reading, cu. ft.	105.650	106.131	106.502
P11.	Meter Volume, @ STP, cu. ft.	98.553	98.479	98.747
P12.	Liquid Volume of Water Condensed, mls.	39	44	45
P13.	Vapor Volume of Water Condensed, @ STP, cu.ft.	1.836	2.071	2.118
P14.	Total Gas Sampled, @ STP, cu. ft.	100.389	100.550	100.865
P15.	Weight of Gas Sampled, Dry, lbs.	7.347	7.342	7.362
P16.	Weight of Gas Sampled, Wet, lbs.	7.433	7.438	7.460
P17.	Percent Isokinetics	102.3	103.0	103.3
Concentration Conversion Factors:				
P18.	50% Excess Air, After Collector			
P19.	50% Excess Air, Before Collector			
P20.	Moisture Conditions Before Collector	1.012	1.013	1.013

Standard Temperature and Pressure (STP) = 29.92 inches Hg, 68 deg. F

Network Environmental, Inc.

EMISSION SOURCE SUMMARY

Standard Analysis

Company Name:	Lacks Industries Barden Plant	Date:	05/01/19
Company Location:	Kentwood, Michigan		
Source Name:	Chrome Plate Exhaust SVK-8		
Sampling Staff:	Cargill/Eerdmans		

Stack Diameter, inches		52.0
Area of Stack, sq ft.		14.748
Static Pressure in Stack, in. H_2O		-0.31
Stack Gas Temperature, deg. F		76
Percent Moisture At Test Location		2.00
Dry Gas Composition:	% Oxygen	20.90
	% Carbon Dioxide	0.00
	% Carbon Monoxide	0.00
	% Nitrogen	79.10
Percent Excess Air At Test Location		
Density, Wet, @ STP, lbs./cu. ft.		0.07399
Molecular Weight, Dry, @ STP, lbs/mole		28.844
Average Gas Velocity, feet/min		2,498
Stack Gas Flow Rate:	ACFM	36,846
	SCFM	35,262
	SCFM, Dry	34,558

1. "Actual" Means At The Conditions Found At The Sampling Location
2. "Dry" Includes Only The Natural Moisture That Would Be Emitted From The Process. Moisture Added Or Subtracted By The Collector Is Not Included.
3. "Wet" Includes The Moisture As Measured At The Sampling Location.
4. "DSCF" Is Under Totally Dry Conditions, All Moisture Removed.

Company Name:	Lacks Industries Barden Plant
Company Location:	Kentwood, Michigan
Source Name:	Chrome Etch Exhaust SVK-2
Sampling Staff:	Cargill/Eerdmans
Date:	5/2/19
Number of Samples:	3
Number of Points:	24
Excess Air Calc. (Y?N)	N
Stack Diameter, In. (If Round Stack)	60.0
Stack Dimension, In. (If Rectangular)	x
% Moisture Before Collector:	

Network Environmental, Inc.

SUMMARY OF EXHAUST GAS PARAMETERS

Company Name: Lacks Industries Barden Plant Date: 05/02/19

Company Location: Kentwood, Michigan

Source Name: Chrome Etch Exhaust SVK-2

Sampling Staff: Cargill/Eerdmans

	Sample Number		1	2	3
G1.	Stack Diameter, inches		60.0	60.0	60.0
G2.	Area of Stack, sq ft.		19.635	19.635	19.635
G3.	Barometric Pressure, in. Hg		29.31	29.31	29.31
G4.	Static Pressure in Stack, in. H_2O		0.13	0.13	0.13
G5.	Stack Gas Temperature, deg. F		82	81	81
G6.	Average Sqrt. Velocity Pressure of Points Sampled		0.8639	0.8512	0.8568
G7.	Percent Moisture At Test Location		1.51	1.36	1.80
G8.	Percent Moisture Before Collector		0.0	0.0	0.0
G9.	Dry Gas Composition:	% Oxygen	20.90	20.90	20.90
		% Carbon Dioxide	0.00	0.00	0.00
		% Carbon Monoxide	0.00	0.00	0.00
		% Nitrogen	79.10	79.10	79.10
G10.	Percent Excess Air At Test Location				
	Density And Molecular Weight Of Stack Gas:				
G11.	Dry, @ STP, lbs./cu. ft.		0.07455	0.07455	0.07455
G12.	Wet, @ STP, lbs./cu. ft.		0.07413	0.07417	0.07405
G13.	Wet, @ Stack Conditions, lbs./cu. ft.		0.07079	0.07095	0.07076
G14.	Molecular Weight, Dry, @ STP, lbs/mole		28.844	28.844	28.844
G15.	Average Gas Velocity, feet/min		2,883	2,837	2,859
	Stack Gas Flow Rate:				
G16.	Stack Conditions, ACFM		56,601	55,706	56,145
G17.	Standard Conditions, SCFM		54,049	53,285	53,655
G18.	Standard Conditions, Dry SCFM		53,235	52,562	52,691

Standard Temperature and Pressure (STP) = 29.92 inches Hg, 68 deg. F

Network Environmental, Inc.

SUMMARY OF PARTICULATE TRAIN PARAMETERS

Company Name: Lacks Industries Barden Plant Date: 05/02/19

Company Location: Kentwood, Michigan

Source Name: Chrome Etch Exhaust SVK-2

Sampling Staff: Cargill/Eerdmans

	Sample Number	1	2	3
P1.	Number of Po nts Sampled	24	24	24
P2.	Duration of Sample, minutes	120	120	120
P3.	Nozzle Diameter, inches	0.25	0.25	0.25
P4.	Nozzle Area, sq. ft.	0.000341	0.000341	0.000341
P5.	Pitot Calibration Factor	0.81	0.81	0.81
P6.	Meter Calibration Factor	0.9903	0.9903	0.9903
P7.	Average Filter Temperature, deg. F			
P8.	Average Meter Temperature, deg. F	80.3	83.7	84.0
P9.	Average Meter Pressure, inches of water	3.361	3.289	3.326
P10.	Meter Volume, Actual Reading, cu. ft.	119.076	118.924	119.320
P11.	Meter Volume, @ STP, cu. ft.	113.845	112.957	113.282
P12.	Liquid Volume of Water Condensed, mls.	37	33	44
P13.	Vapor Volume of Water Condensed, @ STP, cu.ft.	1.742	1.553	2.071
P14.	Total Gas Sampled, @ STP, cu. ft.	115.587	114.510	115.353
P15.	Weight of Gas Sampled, Dry, lbs.	8.487	8.421	8.446
P16.	Weight of Gas Sampled, Wet, lbs.	8.568	8.493	8.542
P17.	Percent Isokinetics	102.7	103.2	103.2
Concentration Conversion Factors:				
P18.	50% Excess A r, After Collector			
P19.	50% Excess A r, Before Collector			
P20.	Moisture Conditions Before Collector	1.010	1.009	1.011

Standard Temperature and Pressure (STP) = 29.92 inches Hg, 68 deg. F

Network Environmental, Inc.

EMISSION SOURCE SUMMARY

Standard Analysis

Company Name:	Lacks Industries Barden Plant	Date:	05/02/19
Company Location:	Kentwood, Michigan		
Source Name:	Chrome Etch Exhaust SVK-2		
Sampling Staff:	Cargill/Eerdmans		

Stack Diameter, inches		60.0
Area of Stack, sq ft.		19.635
Static Pressure in Stack, in. H_2O		0.13
Stack Gas Temperature, deg. F		81
Percent Moisture At Test Location		1.55
Dry Gas Composition:	% Oxygen	20.90
	% Carbon Dioxide	0.00
	% Carbon Monoxide	0.00
	% Nitrogen	79.10
Percent Excess Air At Test Location		
Density, Wet, @ STP, lbs./cu. ft.		0.07412
Molecular Weight, Dry, @ STP, lbs/mole		28.844
Average Gas Velocity, feet/min		2,860
Stack Gas Flow Rate:	ACFM	56,151
	SCFM	53,663
	SCFM, Dry	52,829

1. "Actual" Means At The Conditions Found At The Sampling Location
2. "Dry" Includes Only The Natural Moisture That Would Be Emitted From The Process. Moisture Added Or Subtracted By The Collector Is Not Included.
3. "Wet" Includes The Moisture As Measured At The Sampling Location.
4. "DSCF" Is Under Totally Dry Conditions, All Moisture Removed.